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UNITED STATES DEPARTMENT OF AGRICULTURE  
WASHINGTON, D. C.MONANTHA VETCH<sup>1</sup>

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## INTRODUCTION

*Monantha vetch*<sup>2</sup> is a native of southern Europe and has been introduced into cultivation in that region. The information available in the literature, however, would seem to indicate that the acreage in Europe is very limited.

The first introduction into the United States by the Bureau of Plant Industry, was in 1898 under S. P. I. No. 1483, seed having been procured by W. T. Swingle and forwarded to the Department of Agriculture at Washington in December of that year. Two later introductions have been made, but there appears to be no noticeable difference in the plants of these and the earlier introduction.

At the present time (1930) *monantha vetch* is being grown successfully in the Pacific Coast States of Washington, Oregon, and California, and in the States bordering the Gulf of Mexico it gives promise of value in a limited area. In northwestern California and western Oregon it is grown as a seed crop, and in the Southern States it is being grown experimentally as a green-manure crop. Aside from its use as forage and green manure, it is used in the same way as lentils, with which it compares favorably as human food.

## DESCRIPTION

*Monantha vetch* is a viny plant and in this respect is similar to hairy vetch. In comparison with other commercial vetches it has very fine stems and leaflets (fig. 1) and matures early. It is quite decumbent, ascending only with support. Under average conditions the stems, which are smooth and of a light-green color, attain a length of 2½

<sup>1</sup> The data in this circular reported from Corvallis, Oreg., Tifton, Ga., and Gainesville, Fla., are the result of work carried on cooperatively by the agricultural experiment stations of these States and the U. S. Department of Agriculture.

<sup>2</sup> *Vicia monantha* Desf.

to 4 feet. The smooth light-green leaves have six pairs of leaflets and a short twining tendril. The leaflets are long and narrow, with truncate or blunt ends. The flowers are small, light lavender, or

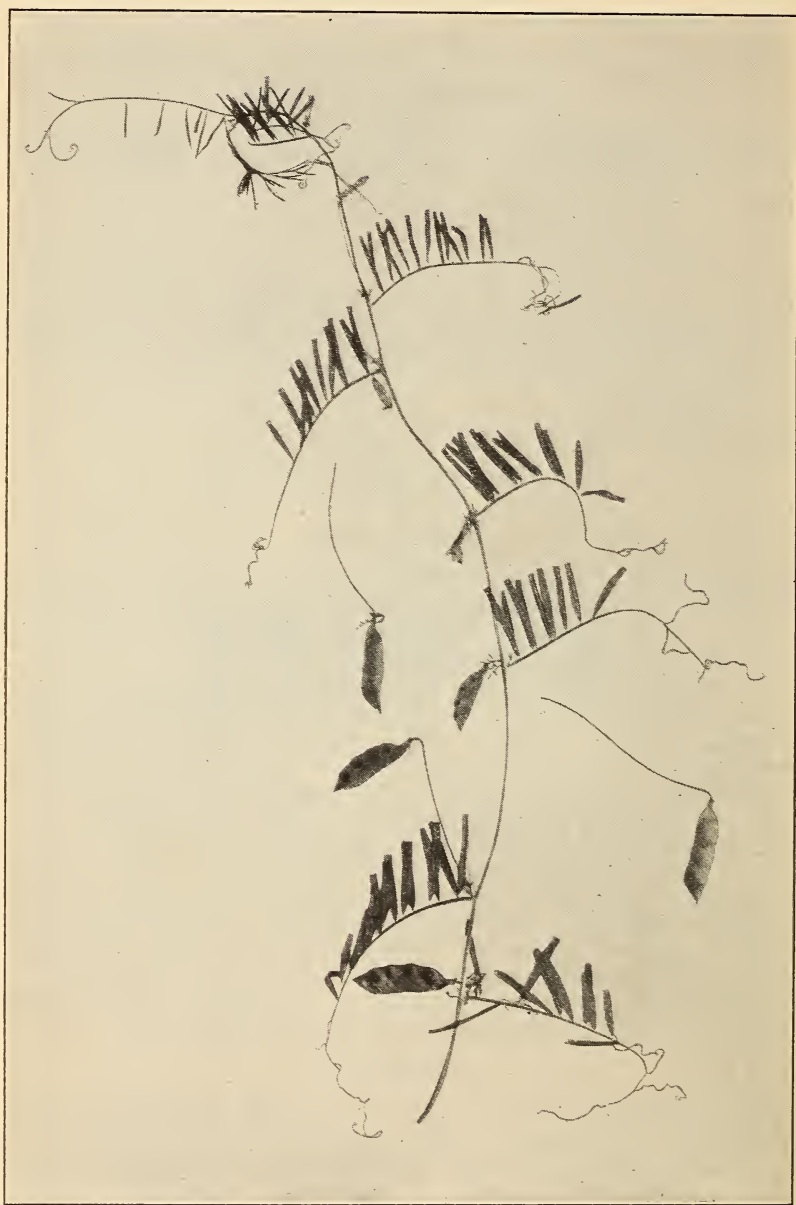


FIGURE 1.—Portion of a stem of monantha vetch showing leaves, flowers, and pods. (About one-half natural size)

nearly white in color, and, as indicated by the Latin name (*Vicia monantha*), are borne singly. From the axils of the leaves long pedicels support the flowers, which seldom fail to produce seed pods.

## LONGEVITY AND HARD SEED

The conditions under which seed is grown determine to some extent the amount of hard seed and period of viability; conditions under which it is kept are of most importance in determining the time of viability. Under conditions at Washington, D. C., monantha vetch seed 9 years old has failed to germinate, while seed 7 years old usually has a high percentage of viable seed. At Corvallis, Oreg., seed of this vetch maintains its viability longer than at Washington, D. C. The percentage of germination in 1928 for seed grown at Corvallis in the years 1915 to 1921, inclusive, excepting 1918, when the seed crop was a failure, was as follows: 1915, 22 per cent; 1916, 48 per cent; 1917, 54 per cent; 1919, 74 per cent; 1920, 90 per cent; 1921, 59 per cent. It will be noted that seed 10 years old germinated over 50 per cent.

There was no hard seed in Oregon-grown monantha vetch for any of the years above mentioned, and other germination tests have indicated that it has no hard seed.

## CLIMATIC REQUIREMENTS

Monantha vetch is one of the less hardy of the vetches. It will endure the winters in the coastal area and mild interior valleys of California and will stand most winters west of the Cascade Mountains in Washington and Oregon. In the Southern States bordering the Gulf of Mexico it has proved too tender for general use except in the coastal region extending about 100 miles inland. Farther north it will survive the milder winters, but will be killed partially or entirely in the more severe seasons. It has withstood temperatures of 15° F. in California, but in the Southern States a temperature as low as this would be likely to cause some damage, probably on account of more variable climatic conditions in the South. A period of high temperature producing tender growth followed by a sudden cold spell will result in serious damage at a temperature that under more equable conditions would do little or no damage. Winter injury in the South is also due to poor growth and lack of establishment before the cold period. Monantha vetch can be grown as a summer annual in the Northern States, but its practical use in that region has not yet been demonstrated.

## SOIL AND MOISTURE REQUIREMENTS

In California and Oregon, where monantha vetch has succeeded best, the soils for the most part are well-drained clay or sandy loams of fairly good fertility. The moisture supply in these same areas is usually abundant. In northwestern California it has succeeded on rolling manzanita land usually considered very poor for small grains. In the Southern States it has made good growth in the sandy coastal-plain area and is as well adapted to such soils as hairy vetch. In general it may be said that monantha vetch is not exacting as to soil requirements and that it is better adapted to poor sandy soils than most of the other commercial vetch varieties or species. While it has been reported as doing well under rather dry conditions, it can not be considered as a drought-resistant plant.



## VALUE AS HAY

The fineness of the stems and leaflets of monantha vetch tend to make it an excellent hay. Limited experience in feeding it to livestock indicates that it is quite palatable, but no experiments have been conducted to determine its value as compared with other hays. It probably has about the same feeding value, however, as alfalfa, common vetch, and other common legumes. Monantha vetch has about the same season of maturity as the Fulghum oat, and in the South where this variety is adapted, monantha can be sown with the oats for support and to give a combination feed. In western Oregon the Red Indian oat has about the same date of maturity as monantha vetch, and in experimental work it has been found to be one of the best varieties to use in mixture for both seed and hay

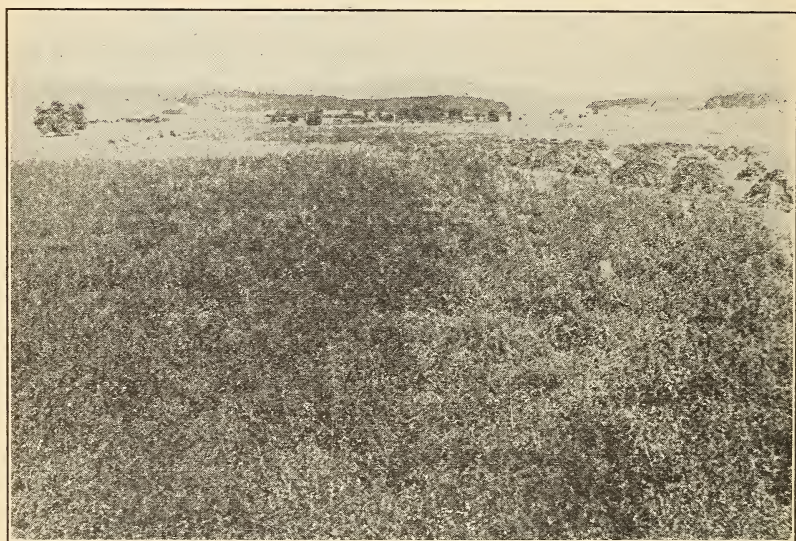


FIGURE 2.—A field of monantha vetch at Corvallis, Oreg. The part that is cut and shocked for hay indicates a heavy yield

purposes. At Tifton, Ga., gray winter peas<sup>3</sup> mature at about the same time as monantha vetch, and in mixture they have given good results. At Corvallis, Oreg., monantha vetch has yielded slightly less hay than common vetch. (Fig. 2.) Yields that may be expected in the South are indicated in Tables 1, 2, 5, 6, 7, 8, 9, 10, and 11.

## VALUE AS GREEN MANURE

In regions where monantha vetch grows successfully it can be used satisfactorily for green-manure or cover-crop purposes, making good winter growth in comparison with similar legumes and maturing earlier than most other vetches. In the Southern States it produces a greater tonnage for early turning under than does hairy vetch; for turning as late as March 15 monantha vetch has produced more than hairy vetch. In the Pacific Coast States it compares

<sup>3</sup> Also known as Austrian winter peas.

favorably with common vetch. Its stems are fine and comparatively firm, so that under orchard conditions it stands trampling well.

According to published results of the Alabama Agricultural Experiment Station, monantha vetch at Auburn in the winters of 1925-26 and 1926-27 outyielded hairy vetch and gray winter peas.<sup>4</sup>

Similar results were obtained in cooperative experimental tests at the Georgia Coastal Plain Experiment Station at Tifton, Ga. However, at both these stations severe winterkilling has occurred occasionally. Yields at Tifton, Ga., for a period of four years are given in Table 1, and yields when monantha vetch is grown preceded by corn and cotton, with both complete and incomplete fertilizers, are given in Table 2. Yields of corn and cotton following monantha vetch are given in Tables 3 and 4. Green-manure yields with various fertilizer treatments are given in Tables 9, 10, and 11.

In the northern Pacific coast area monantha vetch has been used almost exclusively for seed-production purposes; in California it has been tried to some extent for green manure.

While but little experimental work has been done to determine the relative value of this vetch in comparison with other legumes for various green-manure purposes it seems reasonable to assume that with all conditions being equal it probably has about the same value as the other vetches now commonly used.

TABLE 1.—Yields of monantha vetch and other winter crops at Tifton, Ga., 1926-1929

Plots, one-twentieth acre, duplicated; area weighed, one one-hundred-and-sixtieth acre, duplicated; weights of green matter in pounds per acre; time of seeding, Oct. 15-20; rate of seeding per acre (pounds): Hairy vetch, 30; monantha vetch, 35; gray winter peas, 45; rye, 80. Inoculated with commercial inoculating material; previous crop, corn for plots cut March 1 and cotton for plots cut March 15; fertilizer, none with winter crops, 500 pounds of 2-10-4 or 0-10-4 with corn and 1,000 pounds of 3-9-5 or 0-9-5 with cotton. Soil type, Tifton sandy loam bordering on Norfolk]

Green-manure crop	Date cut	Yield per acre					Nitrogen
		1926	1927	1928	1929	Average	
Monantha vetch.....	Mar. 1	<i>Pounds</i> 21,345	<i>Pounds</i> 20,038	<i>Pounds</i> 27,718	<i>Pounds</i> 9,180	<i>Pounds</i> 19,570	<i>Pounds</i> 131.1
Do.....	Mar. 15	17,380	26,412	24,493	14,380	20,666	129.7
Hairy vetch.....	Mar. 1	9,583	8,712	8,820	2,960	7,519	71.8
Do.....	Mar. 15	7,395	9,020	9,256	5,080	7,688	68.0
Gray winter peas <sup>a</sup> .....	Mar. 1	22,215	21,780	20,908	7,880	18,196	142.8
Do.....	Mar. 15	21,017	25,265	19,166	9,360	18,702	144.0
Abruzzi rye.....	Mar. 1	8,929	10,454	8,603	3,580	7,892	-----
Do.....	Mar. 15	10,672	9,162	7,514	10,730	9,520	-----

<sup>a</sup> Also known as Austrian winter peas.

<sup>4</sup> ALABAMA POLYTECHNIC INSTITUTE, EXTENSION SERVICE. SEEDING LEGUMES. Ala. Polytech. Inst. Digest 5(3): 5-6. 1927.

FUNCHESS, M. J. TIME OF SEEDING AND TURNING VETCH FOR COTTON AND CORN. Jour. Amer. Soc. Agron. 20: 294-297. 1928.

TABLE 2.—*Green-manure yields of monantha vetch, hairy vetch, and gray winter peas cut March 4, 1929, at Tifton, Ga.*

[Plots, one-tenth acre; area weighed, one one-hundred-and-sixtieth acre replicated four times; time of seeding, Oct. 22, drilled; rate of seeding per acre (pounds): Hairy vetch, 30; monantha vetch, 35; gray winter peas, 45. Inoculated with commercial inoculating material; previous crop, corn on plots fertilized with 2-10-4 and 0-10-4 and cotton on plots fertilized with 3-9-5 and 0-9-5; fertilizer, 500 pounds with corn and 1,000 pounds with cotton. Soil type, Tifton sandy loam bordering on Norfolk]

Green-manure crop	Fertilizer <sup>1</sup>	Yield per acre, green weight	Green-manure crop	Fertilizer <sup>1</sup>	Yield per acre, green weight
		<i>Pounds</i>			<i>Pounds</i>
Monantha vetch .....	2-10-4	11, 640	Hairy vetch .....	3-9-5	3, 000
Do.....	0-10-4	17, 120	Do.....	0-9-5	2, 920
Do.....	3-9-5	9, 640	Gray winter peas.....	2-10-4	11, 160
Do.....	0-9-5	8, 720	Do.....	0-10-4	7, 560
Hairy vetch.....	2-10-4	5, 920	Do.....	3-9-5	6, 520
Do.....	0-10-4	4, 240	Do.....	0-9-5	9, 240

<sup>1</sup> Percentages, respectively, of nitrogen, phosphorus, and potassium.

TABLE 3.—*Corn yields per acre following winter green-manure crops at Tifton, Ga., 1926-1929*

[Time of seeding green-manure crop, Oct. 15-20; time of turning down green-manure crop, Mar. 15. Green-manure yields are given in Table 1]

Green-manure crop	Fertilizer, <sup>1</sup> 500 pounds per acre, used with the corn only	Yield per acre				
		1926	1927	1928	1929	Average
		<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>
Monantha vetch.....	2-10-4	43.0	37.6	29.0	74.1	45.93
Do.....	0-10-4	44.4	37.7	27.3	73.1	45.63
Hairy vetch.....	2-10-4	53.3	38.3	33.5	65.1	47.55
Do.....	0-10-4	42.6	39.7	24.7	56.0	40.75
Gray winter peas.....	2-10-4	47.9	43.4	48.8	73.9	53.50
Do.....	0-10-4	58.0	50.1	54.9	70.4	58.35
Rye.....	2-10-4	33.7	38.2	39.3	51.2	40.60
Do.....	0-10-4	36.4	33.2	34.8	41.0	36.35
None.....	2-10-4	41.5	41.5	33.7	46.8	40.88
Do.....	0-10-4	35.1	34.6	29.5	50.5	37.43

<sup>1</sup> See footnote to Table 2.

TABLE 4.—*Seed-cotton yields per acre following winter green-manure crops at Tifton, Ga., 1926-1929*

[Time of seeding green-manure crop, Oct. 15-20; time of turning down green manure, Mar. 1-4. Green-manure yields are given in Table 1]

Green-manure crop	Fertilizer, <sup>1</sup> 1,000 pounds per acre, used with cot- ton only	Yield per acre				
		1926	1927	1928	1929	Average
		<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Monantha vetch.....	3-9-5	1, 228	978	802	1, 513	1, 130
Do.....	0-9-5	947	958	667	1, 165	934
Hairy vetch.....	3-9-5	1, 230	865	807	1, 388	1, 072. 5
Do.....	0-9-5	863	758	602	773	749
Gray winter peas.....	3-9-5	1, 294	793	696	1, 223	1, 001. 5
Do.....	0-9-5	1, 286	817	594	1, 405	1, 025. 5
Rye.....	3-9-5	1, 189	917	820	985	978
Do.....	0-9-5	960	895	577	885	829
None.....	3-9-5	957	786	662	965	842. 5
Do.....	0-9-5	691	684	422	718	629

<sup>1</sup> See footnote to Table 2.



## VALUE AS PASTURAGE

Monantha vetch makes good-quality pasturage, and where an annual winter legume is needed it will be found valuable for this purpose. Its stems and leaves are fine, and it makes growth under lower temperature conditions than most other legumes. It will stand considerable trampling, but is not especially productive under such treatment.

Monantha vetch will probably cause bloat in cattle, but there is no evidence on this point. The danger may be lessened if the vetch is planted with oats or other grain, and this mixture will probably have the added advantage of producing more feed than the vetch alone.

## TIME AND RATE OF SEEDING

Monantha vetch is a winter annual in regions having mild winters, and under such conditions it should be sown in the fall. In the North it must be grown as a summer annual and should be planted as early in the spring as the ground can be worked. In northwestern California and in western Oregon and Washington monantha vetch should be sown as early in the fall as rains will permit. In the South too early planting may result in serious damage from nematodes while late planting may result in thin stand and poor winter growth. In early seedings in Florida serious damage by *Rhizoctonia* has been noted. If the crop is intended for spring pasturage it can be planted somewhat later than when intended for winter cover and green manure. In the Southern States the best average planting time is about the 1st of October; in Florida October 15 is recommended. Tables 5 and 6 give yields from different dates of planting at Tifton, Ga., and Gainesville, Fla.

The rate of seeding depends somewhat upon climatic conditions. If some winterkilling is likely, a heavier seeding should be made than where no winterkilling is to be expected. In western Oregon from 60 to 80 pounds of seed per acre has been found the best seeding rate for both hay and seed production. In the Southern States much lighter seeding rates have been used. In this region from 20 to 40 pounds per acre is being recommended. When seeded with a grain crop the quantity of seed of the vetch should be reduced but little. The quantity of grain used in the mixture, however, should be but about half the quantity that would be used if the grain was seeded alone. Table 7 shows yields from seedings at different rates at Tifton, Ga.

TABLE 5.—*Dates of seeding monantha vetch and yields obtained at Tifton, Ga., 1929-30*

[Plots, one-twentieth acre; rate of seeding, 35 pounds per acre drilled; inoculated with commercial culture; fertilizer, 500 pounds of 2-10-4 under corn, none with the cover crop. Previous crop, corn. Soil type, Tifton sandy loam bordering Norfolk]

Date seeded	Acre yield (green weight) when cut—		Date seeded	Acre yield (green weight) when cut—	
	Mar. 18, 1930	Apr. 1, 1930		Mar. 18, 1930	Apr. 1, 1930
1929	<i>Pounds</i>	<i>Pounds</i>	1929	<i>Pounds</i>	<i>Pounds</i>
Oct. 17.....	7, 139	10, 379	Nov. 15.....	6, 080	7, 640
Nov. 1.....	8, 000	7, 840	Dec. 1.....	1, 699	3, 139

TABLE 6.—*Acre yields of monantha vetch compared with hairy vetch and gray winter peas planted at different dates at Gainesville, Fla., winter of 1928-29*

[Plots, 15 by 1, 300 feet, in triplicate; area weighed, 0. 023 acre in triplicate. Rate of seeding per acre: General, 20 pounds for vetch, 30 pounds for peas; special, thin, 15 pounds for vetch, 25 pounds for peas; special, medium, 20 pounds for vetch, 30 pounds for peas; special, thick, 25 pounds for vetch, 35 pounds for peas. Inoculated with commercial inoculum and by soil transfer; previous crop, corn; fertilizer, none with vetch or with the preceding corn. Soil type, Norfolk sand. Plots cut Mar. 6-9]

Date planted	Hairy vetch		Gray winter peas		Monantha vetch	
	Green	Dry	Green	Dry	Green	Dry
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Sept. 28.....	3,349.4	890.9	5,485.7	1,014.9	7,678.9	1,620.2
Oct. 9.....	4,967.3	1,187.2	5,726.0	1,259.7	7,016.1	1,382.2
Oct. 25, thin.....	2,943.9	715.4	4,369.1	1,328.2	5,532.8	1,294.7
Oct. 25, medium.....	3,692.4	897.3	4,882.4	1,484.2	5,302.7	1,240.8
Oct. 25, thick.....	4,727.0	1,148.7	6,486.1	1,971.8	5,855.2	1,370.1
Nov. 9.....	3,730.9	742.4	4,054.0	685.1	4,095.4	733.1
Nov. 26.....	1,613.2	366.2	1,621.2	167.0	2,935.9	634.2
Dec. 13.....	1,203.7	310.6	1,043.3	196.1	1,290.1	269.6

TABLE 7.—*Rates of seeding monantha vetch and yields obtained at Tifton, Ga., 1928-29*

[Plots, one-twentieth acre; area weighed, one one-hundred-and-sixtieth acre in duplicate; time of seeding Oct. 19, 1928, drilled; inoculated with commercial inoculating material; previous crop, cotton; fertilizer, 1,000 pounds of 3-9-5 under the cotton, none with the cover crop. Soil type, Tifton sandy loam bordering Norfolk]

Seeding rate per acre	Acre yield (green weight) when cut—		Seeding rate per acre	Acre yield (green weight) when cut—	
	Mar. 15, 1929	Apr. 1, 1929		Mar. 15, 1929	Apr. 1, 1929
	<i>Pounds</i>	<i>Pounds</i>		<i>Pounds</i>	<i>Pounds</i>
20 pounds.....	10,040	9,099	35 pounds.....	8,640	6,480
25 pounds.....	11,440	8,320	40 pounds.....	8,640	7,880
30 pounds.....	8,080	5,699			

### METHOD OF SEEDING

Monantha vetch is commonly grown as a close-drilled crop. If it is to be used as green manure, cover crop, hay, or pasturage this is the best method; if it is to be used for seed purposes the crop can be sown either in wide rows or in close drills. The latter method is employed for this and similar crops in western Oregon and is probably the most economical. When a grain crop is used with monantha vetch for any purpose the planting should be in close drills.

An ordinary grain drill is suitable for planting monantha vetch. The seed should be covered in about the same manner as wheat, and if the soil is somewhat dry a press-wheel drill should be used whenever possible.

In areas of the Southern States where grain drills are not available the seed may be broadcast and plowed in with a 1-horse plow or covered by disking or in some other way.

Table 8 gives yields of monantha vetch when seeded in different ways at Tifton, Ga. The lighter green weight on April 1 is accounted for by the drying of the crop due to maturing and to damage by aphids.

TABLE 8.—*Methods of seeding monantha vetch and yields obtained at Tifton, Ga., 1928-29*

[Plots, one-twentieth acre; area weighed, one one-hundred-and-sixtieth acre in duplicate; time of seeding, Oct. 19, 1928; rate of seeding 35 pounds per acre. Inoculated with commercial inoculating material; previous crop, cotton; fertilizer, 1,000 pounds of 3-9-5 under the cotton, none with cover crop. Soil type, Tifton sandy loam bordering Norfolk]

Method of seeding	Acre yield (green weight) when cut—		Method of seeding	Acre yield (green weight) when cut—	
	Mar. 15, 1929	Apr. 1, 1929		Mar. 15, 1929	Apr. 1, 1929
	<i>Pounds</i>	<i>Pounds</i>		<i>Pounds</i>	<i>Pounds</i>
Grain drill.....	5,680	3,800	Broadcast and harrowed..... 18-inch rows.....		
Broadcast and disked..	4,259	2,640		3,680	2,760
Broadcast and plowed	4,720	3,099		3,520	4,259

### INOCULATION

The same nitrogen-fixing organism that inoculates other vetches inoculates monantha vetch, and wherever hairy vetch and common vetch need inoculation it will be necessary to inoculate monantha vetch. Either pure cultures or, if convenient, soil from a field where vetch has been grown successfully may be used. The soil may be mixed with the seed in small quantity or scattered over the field at the rate of 500 pounds per acre.

While inoculation is important everywhere, it should be given special attention in the Southern States, as failures with vetch are often traceable directly to lack of inoculation. One should make certain that the inoculation cultures used are fresh or that the soil used carries the inoculating organism and that the seed is thoroughly and carefully inoculated. It is advisable in the South on land that has never been planted to vetch to inoculate very thoroughly. At Gainesville, Fla., best results were obtained by using both pure-culture and soil-transfer methods.

### USE OF FERTILIZERS

In the Pacific Coast States fertilizers are not necessary for the successful growth of monantha vetch. In the Southern States east of the Mississippi River it is almost universally necessary to use fertilizers. Phosphoric acid seems to be the one thing especially needed, but in planting this vetch for the first time on land that has not grown legumes or received applications of nitrogen in the form of commercial fertilizers, nitrogen in some available form should be included. For most parts of the South the use of from 300 to 400 pounds of 16 per cent superphosphate (acid phosphate) per acre is recommended. This should be applied to the land preceding the planting of the vetch. If it is necessary to use nitrogen, sodium nitrate or sulphate of ammonia at the rate of 100 pounds of the ordinary commercial form per acre probably will be sufficient. Well-rotted barnyard manure at the rate of 15 to 20 tons per acre is one of the best fertilizers to insure a stand and good growth of vetch on land that has not grown this crop before, and much better inoculation has been secured by the use of inoculum on seed planted with a good application of barnyard manure. Little if any additional fertilizer is needed on lands regularly fertilized for a summer crop of cotton or corn.



Tables 9, 10, and 11 give yields of monantha vetch, hairy vetch, and gray winter peas when fertilized in different ways. It will be noted that the yields of monantha vetch and gray winter peas in Table 10 are much lighter on April 9 than on March 24. This is due to loss occasioned by aphids and subsequent drying. The maximum green weight is attained earlier than with hairy vetch or gray winter peas.

TABLE 9.—*Monantha vetch compared with hairy vetch and gray winter peas on low-lying Norfolk sand at Gainesville, Fla., 1927-28*

[Plots, 1 acre, not replicated; area weighed, 100 square feet replicated three times; time of seeding, Oct. 24, 1927, broadcast; rate of seeding per acre (pounds): Monantha and hairy vetch, 20; gray winter peas, 30. Inoculated with commercial inoculating material; previous crop, corn. Time of cutting, Mar. 14, 1928]

Crop	Fertilizer used	Acre yield		
		Green forage	Oven-dry forage	Total nitrogen
		<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Hairy vetch.....	None.....	4,008	892	53.7
Monantha vetch.....	do.....	4,661	726	30.8
Gray winter peas.....	do.....	5,706	889	37.6
Hairy vetch.....	400 pounds superphosphate.....	10,019	1,676	92.2
Monantha vetch.....	do.....	10,672	1,732	80.0
Gray winter peas.....	do.....	10,280	1,555	84.3
Hairy vetch.....	600 pounds superphosphate.....	14,200	2,375	130.6
Monantha vetch.....	do.....	11,456	1,859	85.9
Gray winter peas.....	do.....	15,550	2,352	127.5

TABLE 10.—*Yields of monantha vetch, hairy vetch, and gray winter peas at Gainesville, Fla., 1928*

[Plots, 17 by 100 feet, not replicated; area weighed, 100 square feet replicated three times; time of seeding, Oct. 7, 1927; rate of seeding per acre (pounds): Monantha and hairy vetch, 20; gray winter peas, 30. Inoculated with commercial inoculating material; previous crop, watermelons. Soil type, Norfolk sand]

Crop	Fertilizer used		Acre yield					
	Material	Quantity	Green forage, harvested—		Oven-dry forage, harvested—		Total nitrogen, harvested—	
			Mar. 24	Apr. 9	Mar. 24	Apr. 9	Mar. 24	Apr. 9
		<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Hairy vetch.....	Muriate of potash.....	100	8,276	8,276	1,712	2,193	48.1	49.2
Monantha vetch.....	do.....	100	7,013	3,069	1,543	613	32.4	11.9
Gray winter peas.....	do.....	100	5,358	1,960	980	928	28.9	23.2
Hairy vetch.....	do.....	100	8,102	7,405	1,676	1,964	47.1	61.4
	Superphosphate.....	400						
Monantha vetch.....	Muriate of potash.....	100	6,970	2,831	1,533	840	32.2	16.3
	Superphosphate.....	400						
Gray winter peas.....	Muriate of potash.....	100	6,450	1,634	1,180	776	34.8	19.4
	Superphosphate.....	400						
Hairy vetch.....	Muriate of potash.....	100	8,451	10,018	1,750	2,653	49.2	55.0
	Superphosphate.....	800						
Monantha vetch.....	Muriate of potash.....	100	6,578	2,940	1,448	871	30.4	16.9
	Superphosphate.....	800						
Gray winter peas.....	Muriate of potash.....	100	7,275	1,416	1,332	672	39.3	16.8
	Superphosphate.....	800						

<sup>1</sup> The extremely low yields of monantha vetch and gray winter peas on Apr. 9 were due to an attack by aphids. Hairy vetch was not affected.



TABLE 11.—*Yields of monantha vetch, hairy vetch, and gray winter peas at Gainesville, Fla., 1929*

[Plots, 17 by 100 feet, not replicated; area weighed, 100 square feet replicated three times, time of seeding, Oct. 25, 1928; rate of seeding per acre (pounds): Monantha and hairy vetch, 25; gray winter peas, 35. Inoculated with commercial inoculating material; previous crop, corn. Soil type, Norfolk sand; time of cutting, Mar. 9, 1929]

Crop	Fertilizer used	Acre yield	
		Green forage	Oven-dry forage
		Pounds	Pounds
Hairy vetch.....	None.....	8,766	1,472
Monantha vetch.....	do.....	13,612	1,810
Gray winter peas.....	do.....	9,365	1,274
Hairy vetch.....	400 pounds superphosphate.....	12,271	2,051
Monantha vetch.....	do.....	10,237	1,423
Gray winter peas.....	do.....	9,039	1,048
Hairy vetch.....	800 pounds superphosphate.....	15,028	2,840
Monantha vetch.....	do.....	8,276	1,266
Gray winter peas.....	do.....	13,721	1,990
Hairy vetch.....	10 tons of manure.....	15,899	2,671
Monantha vetch.....	do.....	16,988	2,259
Gray winter peas.....	do.....	12,850	1,748
Hairy vetch.....	400 pounds superphosphate+10 tons of manure.....	13,721	2,497
Monantha vetch.....	do.....	17,206	2,392
Gray winter peas.....	do.....	14,593	1,693
Hairy vetch.....	800 pounds superphosphate+10 tons of manure.....	16,553	3,128
Monantha vetch.....	do.....	10,454	1,599
Gray winter peas.....	do.....	17,206	2,495

#### HARVESTING FOR HAY

Like other vetches, monantha vetch should be cut for hay when the first pods begin to ripen. In seasons when aphids attack the vetch it may be necessary to cut the crop early to avoid serious damage, and for this reason it often will be necessary in the Southern States to cut the vetch while in full bloom. When cut at this stage it will make good hay, although it may be somewhat harder to cure than when cut at a more mature period.

On account of its fine stems and twining growth, monantha vetch is possibly a little harder to cut with an ordinary mower than common vetch, but is no more difficult to handle. When a swather attachment is used behind the cutter bar of the mower the cutting is greatly facilitated, and when the crop is grown in combination with oats or other small grains there usually is no difficulty in cutting. Subsequent to cutting, the hay should be handled as rapidly as is consistent with good curing. The fine stems dry readily, and it is not difficult to make a good quality of hay.

#### HARVESTING FOR SEED

When monantha vetch is to be used for seed it should be cut when the lower pods are ripe. At that time the upper pods will be well formed, and a maximum yield will be secured. If the crop is quite light and is planted with oats a drop-rake reaper may be used, but with a heavier growth either alone or in combination an ordinary mower with swather attachment will be found more satisfactory. From the windrow the crop should be placed in large cocks and handled as rapidly as possible. From the cocks it can be hauled direct to the thresher or stacked if a thresher is not available. As rapid and careful handling as possible from the cut swath to the thresher is

necessary to insure maximum yields. Although the seed habits of monantha vetch are fairly good and it does not shatter so badly as common or hairy vetch, it shatters sufficiently to make rapid and careful handling advisable.

### THRESHING

An ordinary threshing machine will handle monantha vetch with no difficulty, but it is necessary to run the cylinder more slowly than when threshing wheat or oats. A speed of about 700 revolutions per minute has been found to be satisfactory. It may also be necessary to remove some or all of the concave teeth if too much of the seed is cracked. Keeping the cylinder full at all times materially reduces cracking or chipping the seed.

### CLEANING SEED

Monantha vetch seed is rather more difficult to clean than the majority of other vetch seeds, because of its flattened and somewhat oval shape and variation in size. The screen cleaner equipped with a strong wind blast will separate the seed from oats very well. When the seed is mixed with that of other varieties of vetch or with wheat it is often necessary to use the spiral cleaner to separate them effectively.

### YIELD OF SEED

In experimental trials and in commercial plantings in western Oregon and in California monantha vetch has given good seed yields consistently outyielding hairy vetch and comparing favorably with Hungarian and common vetch. At Corvallis, Oreg., in experimental plantings yields as high as 2,640 pounds per acre have been obtained, and the average yield for 13 years has been 1,652 pounds.

In the Southern States vetches seed very poorly. On account of its early season of maturity, monantha vetch seeds more abundantly than hairy vetch in this region, but it does not yield with enough regularity or in sufficient quantity to make seed growing profitable. In experiments at Gainesville, Fla., in 1927-28 with various cultural treatments, the highest yield of seed was 269 pounds per acre.

### INSECTS IN RELATION TO POLLINATION

Insects are of considerable value in the pollination of monantha-vetch flowers. Visitations of insects of many kinds are very heavy because of the early-blooming period and the absence of quantities of other flowers. The flowers are small and easily worked by bees.

### INSECT ENEMIES

Monantha vetch is subject to attacks by aphids. In western Oregon only in occasional seasons has it suffered severely from these insects, and then, on account of the earliness of monantha vetch, the damage has been lighter than in the case of common vetch. However, in years of heavy aphid attack it is damaged more rapidly than other varieties, probably because of its fine leaves and stems and dense growth.

In the Southern States there is but little or no damage by aphids when the crop is turned down fairly early for green manure. If allowed to stand later for hay or any other purpose, aphids will usually do serious damage the first half of April or about that time.

No other insects have done serious damage.

#### FUNGIOUS DISEASES

No serious fungous diseases have attacked monantha vetch. It usually has some leaf spot (*Ascochyta viciae*), but this does little damage. On the Pacific coast during recent years stem rot (*Sclerotinia trifoliorum*) has caused some loss. During wet, warm springs, plantings made alone which have attained a heavy growth are attacked and some loss occurs. However, the disease spreads slowly and seldom damages large areas, but occurs in spots most favorable for its inroads.

Land on which stem rot has attacked this vetch should not be seeded to vetch again for a period of at least three years. In the South and on the Pacific coast a reddish discoloration of the plant is often observed, but this does not seem to be due to a fungus. It is more pronounced on poor or wet land or land low in organic matter and deficient in plant food. Lack of inoculation and winter injury may also be contributing factors toward this condition.

In Florida serious damage by *Rhizoctonia* sp. to early fall plantings has been noted at the Florida Agricultural Experiment Station.

#### NEMATODE INJURY

As far as has been determined by general observation, monantha vetch is no more resistant to nematodes than other vetches. If this vetch is planted early in the fall nematodes are apt to do considerable damage, but if it is sown about October 1 or later little damage will occur.

#### SUMMARY

Monantha vetch was first introduced into the United States by the Bureau of Plant Industry, United States Department of Agriculture, in 1898.

In general habit of growth it is similar to common and hairy vetch.

It is adapted to the mild regions of the Pacific Coast States and to the southern parts of the States bordering on the Gulf of Mexico.

In Oregon and Washington and the coastal area of California seed is produced in abundance. In the southeastern part of the United States seed production has not been successful.

The seed is edible and similar to lentils in this respect.

Monantha vetch makes growth at a lower temperature than hairy vetch or common vetch, and for this reason it is desirable for winter green manure in areas having mild winters.

Seeding should be at the rate of from about 30 to 70 pounds per acre, depending on climatic conditions and the purpose for which the crop is to be used.

In the southern and western United States seeding should be done in the fall.

As hay and pasturage monantha vetch is similar to common and hairy vetch.

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